

Current and Historical Deposition of PBDEs, Pesticides, PCBs, and PAHs to Rocky Mountain National Park

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An analytical method was developed for the trace analysis of 98 semivolatile organic compounds (SOCs) in remote, high-elevation lake sediment. Sediment cores from Lone Pine Lake (west of the Continental Divide) and Mills Lake (east of the Continental Divide) in Rocky Mountain National Park, CO, were dated using ^{210}Pb and ^{137}Cs and analyzed for polybrominated diphenyl ethers (PBDEs), organochlorine pesticides, phosphorothioate pesticides, thiocarbamate pesticides, amide herbicides, triazine herbicides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) using this method. SOC deposition profiles were reconstructed, and deposition half-lives and doubling times were calculated, for U.S. historic use pesticides (HUPs) and current-use pesticides (CUPs) as well as PBDEs, PCBs, and PAHs. Sediment records indicate that the deposition of CUPs has increased in recent years, while the deposition of HUPs has decreased since U.S. restriction, but has not been eliminated. This is likely due to the revolatilization of HUPs from regional soils, atmospheric transport, and deposition. Differences in the magnitude of SOC sediment fluxes, flux profiles, time trends within those profiles, and isomeric ratios suggest that SOC deposition in high-elevation ecosystems is dependent on regional upslope wind directions and site location with respect to regional sources and topographic barriers.